

What is claimed is:

1. A non-aqueous electrolyte secondary battery comprising:  
a battery device having a positive electrode having a collector, on which a positive electrode active material layer containing a positive electrode material is formed, a negative electrode, and a non-aqueous electrolyte layer, the battery device being sealed in a film-state packaging member,  
wherein concentration in mass ratio of a free acid in the electrolyte layer is 60 ppm and less.
2. A non-aqueous electrolyte secondary battery according to claim 1, wherein a metal foil laminate case or a laminated film obtained by coating metal foil with a resin and having a structure of packaging resin layer/metal film/sealant layer is used.
3. A non-aqueous electrolyte secondary battery according to claim 2, wherein the positive electrode active material is a composite oxide  $\text{LiMO}_2$  (where, M is at least one material selected from Co, Ni, and Mn) made of a lithium and a transition metal.
4. A non-aqueous electrolyte secondary battery according to claim 3, wherein the composite oxide of a lithium and a transition metal is at least one material selected from  $\text{LiCoO}_2$ ,  $\text{Li}_x\text{Co}_{1-y}\text{Al}_y\text{O}_2$  (where  $0.05 \leq x \leq 1.10$  and  $0.01 \leq y \leq 0.10$ ),  $\text{LiNiO}_2$ ,  $\text{LiNi}_y\text{Co}_{1-y}\text{O}_2$  (where  $0 < y < 1$ ),  $\text{Li}_x\text{Ni}_y\text{M}_{1-y}\text{O}_2$

(where M denotes at least one of transition metals, B, Al, Ga, and In,  $0.05 \leq x \leq 1.10$  and  $0.7 \leq y \leq 1.0$ ), and  $\text{LiMn}_2\text{O}_4$ .

5. A non-aqueous electrolyte secondary battery according to claim 4, wherein the positive electrode active material is  $\text{LiCoO}_2$ .

6. A non-aqueous electrolyte secondary battery according to claim 1, wherein the electrolyte is made of a lithium salt and a polymer compound, in which the lithium salt is dissolved or mixed, and

one or more polymer compounds selected from ether-based polymers such as poly(ethylene oxide) and a crosslinked of the poly(ethylene oxide), poly(methacrylate) ester polymer, acrylate polymer, and fluorine polymer such as poly(vinylidene fluoride) and poly(vinylidene fluoride-co-hexafluoropropylene) is/are used.

7. A non-aqueous electrolyte secondary battery according to claim 1, wherein the electrolyte layer is made of a lithium salt, a non-aqueous solution, and a polymer material, and at least one of  $\text{LiPF}_6$ ,  $\text{LiBF}_4$ ,  $\text{LiAsF}_6$ ,  $\text{LiClO}_4$ ,  $\text{LiCF}_3\text{SO}_3$ ,  $\text{Li}(\text{CF}_3\text{SO}_2)_2\text{N}$ ,  $\text{LiC}_4\text{F}_9\text{SO}_3$ ,  $\text{LiCl}$ , and  $\text{LiBr}$  is mixed as a lithium salt.

8. A non-aqueous electrolyte secondary battery comprising:  
a positive electrode having a positive electrode collector, on which a positive electrode active material layer containing a positive electrode

wherein average particle diameter of the positive electrode active material lies in a range from 10 to 22  $\mu\text{m}$ .

9. A non-aqueous electrolyte secondary battery according to claim 8, wherein the positive electrode active material has minimum particle diameter of 5  $\mu\text{m}$  or larger, maximum particle diameter of 50  $\mu\text{m}$  and less, and specific surface area of 0.25  $\text{m}^2/\text{g}$  and less.
10. A non-aqueous electrolyte secondary battery according to claim 8, wherein the packaging member is a laminated film obtained by coating metal foil with a resin, a polymer film, or a metal film.
11. A non-aqueous electrolyte secondary battery according to claim 8, wherein the positive electrode active material is a lithium-transition metal complex oxide  $\text{LiMO}_2$  (where, M is at least one material selected from Co, Ni, and Mn).
12. A non-aqueous electrolyte secondary battery according to claim 11, wherein the complex oxide of the lithium and the transition metal is at least one material selected from  $\text{LiCoO}_2$ ,  $\text{Li}_x\text{Co}_{1-y}\text{Al}_y\text{O}_2$  (where  $0.05 \leq x \leq 1.10$  and  $0.01 \leq y \leq 0.10$ ),  $\text{LiNiO}_2$ ,  $\text{LiNi}_y\text{Co}_{1-y}\text{O}_2$  (where  $0 < y < 1$ ),

13. A non-aqueous electrolyte secondary battery according to claim 12, wherein the positive electrode active material is  $\text{LiCoO}_2$ .

one or more polymer compounds selected from ether-based polymers such as poly(ethylene oxide) and a crosslinked of the poly(ethylene oxide), poly(methacrylate) ester polymer, acrylate polymer, and fluorine polymer such as poly(vinylidene fluoride) and poly(vinylidene fluoride-co-hexafluoropropylene) is/are used.

a positive electrode having a positive electrode collector, on which a positive electrode active material layer containing a positive electrode material is formed, a negative electrode having a negative electrode collector, on which a negative electrode active material layer is formed, and a film-state case as a packaging member,

wherein the positive electrode active material layer contains 0.15 percent by weight of carbonate compound and less.

16. A non-aqueous electrolyte secondary battery according to claim 15, wherein moisture contained in the positive electrode active material is 300 ppm and less.
17. A non-aqueous electrolyte secondary battery according to claim 15, wherein the positive electrode active material is a complex oxide  $\text{LiMO}_2$  (where, M is at least one material selected from Co, Ni, and Mn) made of a lithium and a transition metal.
18. A non-aqueous electrolyte secondary battery according to claim 15, wherein the carbonate contained in the positive electrode active material is  $\text{LiCoO}_3$ .
19. A non-aqueous electrolyte secondary battery according to claim 17, wherein the complex oxide of a lithium and a transition metal is at least one material selected from  $\text{LiCoO}_2$ ,  $\text{Li}_x\text{Co}_{1-y}\text{Al}_y\text{O}_2$  (where  $0.05 \leq x \leq 1.10$  and  $0.01 \leq y \leq 0.10$ ),  $\text{LiNiO}_2$ ,  $\text{LiNi}_y\text{Co}_{1-y}\text{O}_2$  (where  $0 < y < 1$ ),  $\text{Li}_x\text{Ni}_y\text{M}_{1-y}\text{O}_2$  (where M denotes at least one of a transition metal, B, Al, Ga, and In,  $0.05 \leq x \leq 1.10$  and  $0.7 \leq y \leq 1.0$ ), and  $\text{LiMn}_2\text{O}_4$ .
20. A non-aqueous electrolyte secondary battery according to claim 15, wherein the positive electrode active material is  $\text{LiCoO}_2$ .
21. A non-aqueous electrolyte secondary battery according to claim 15, wherein the packaging member is a aluminum laminate pack obtained by

22. A non-aqueous electrolyte secondary battery according to claim 15, wherein the electrolyte is made of a lithium salt and a polymer compound in which the lithium salt is dissolved, and

one or more polymer compounds selected from ether-based polymers such as poly(ethylene oxide) and a crosslinked of the poly(ethylene oxide), poly(methacrylate) ester polymer, acrylate polymer, and fluorine polymer such as poly(vinylidene fluoride) and poly(vinylidene fluoride-co-hexafluoropropylene) is/are used.